

## Study...

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chology professors Harold Pashler of the University of California, San Diego; Mark McDaniel of Washington University in St. Louis; Doug Rohrer of the University of South Florida; and Robert Bjork of the University of California, Los Angeles.

The researchers—all cognitive psychologists with an interest in the science of learning—reviewed major studies that promoted the effectiveness of teaching to different learning styles to see whether those studies had reached valid conclusions.

The researchers claim that, out of dozens of studies purporting to show the effectiveness of teaching to different learning styles, none managed to prove scientifically that students learn better when taught according to their preferred modality.

According to the researchers, if there is no evidence that teaching to different learning styles works, school funds that support learning-style assessments and teaching tools should be diverted to support evidence-based teaching practices instead.

"The contrast between the enormous popularity of the learning-styles approach within education and the lack of credible evidence for its utility is, in our opinion, striking and disturbing," the researchers concluded. "If classification of students' learning styles has practical utility, it remains to be demonstrated."

Some ed-tech advocates have responded with skepticism, arguing that anecdotal evidence suggests otherwise.

"As a parent and former teacher, I wouldn't be quite so quick to discount teaching to learning styles. All I need to do

is look at my son's learning to know that," said Don Knezek, chief executive officer of the International Society for Technology in Education.

The report's findings could have important implications for the ed-tech field, which has benefited from the idea that students learn best in different ways. For example, many educators have used multimedia to differentiate their instruction, so that students who are considered "auditory" learners might listen to a lecture, while those who are considered "visual" learners might watch a video clip of the same information.

Proponents of the learning-style theory believe that effective instruction requires "diagnosing individuals' learning style and tailoring instruction accordingly," according to the report. It notes that the National Association of Secondary School Principals (NASSP) helped develop a widely distributed learning-style test in the 1980s.

But to prove that teaching to preferred learning styles helps students learn more effectively, the researchers wrote, any credible study needs "robust documentation of a very particular type of experimental finding."

The report explains: "First, students must be divided into groups on the basis of their learning styles, and then students from each group must be randomly assigned to receive one of multiple instructional methods. Next, students must sit for a final test that is the same for all students. Finally, in order to demonstrate that optimal learning requires that students receive instruction tailored to their putative learning style, the experiment must reveal a specific type of interaction between learning style and instructional method: The in-

structional method that proves most effective for students with one learning style is not the most effective method for students with a different learning style."

Upon reviewing major learning-style studies, the researchers say they found "virtually no evidence" that teaching to learning styles helps students learn, simply because few studies have used an experimental methodology capable of testing the scientific validity of the learning-style approach. According to the researchers, studies that did use an appropriate method found results that flatly contradict the learning-style theory. The studies reviewed by the researchers are detailed in the report.

The report says much more research is needed to validate the learning-style theory. But until then, should schools really stop funding the tools and training needed to help teach to various learning styles, as the researchers suggest?

Basing the effectiveness of instructional approaches on test scores alone is not an accurate way of measuring whether students are learning, Knezek said.

"We need to inspire students to learn, and part of that is trying to tailor learning to different styles, or preferences, of learning," he said. "Education is not going to get anywhere by bashing the process of discovering student preferences, and it certainly won't help curb the current dropout rates. Students are saying they are bored with learning. One way we can make learning relevant and exciting for them is by finding out what they prefer, how they want to learn, and tailoring instruction to that."

Rather than assessing students' learning styles and then targeting instruction ac-

cordingly, perhaps a better approach would be to integrate all of the various modalities into one's instruction, said Mel Riddle, associate director of high school services at NASSP and the organization's 2006 High School Principal of the Year.

This approach, commonly referred to as Universal Design for Learning, still recognizes that students might learn best in different ways, but it gives every student multiple ways of acquiring and demonstrating knowledge. Creating such a flexible learning environment can accommodate differences in how individual students learn—without requiring a learning-style test.

Many educators say they are "held accountable for differentiating instruction, but I really haven't seen a lot of teachers being told, 'You must create assessments and instruction based on student learning styles,'" Riddle said. "And I certainly wouldn't recommend spending time and money on an idea that isn't evidence-based. Schools have a limited budget now, and I don't see that ending any time soon. Schools need to identify different leverage points for funding, such as literacy instruction or math proficiency, and fund practices that are proven to help students learn."

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## Broadband...

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makers by Feb. 17, but FCC Chairman Julius Genachowski has asked for a one-month extension so the agency can comb through the huge number of public comments it has received over the past year as it has gathered input on how to make universal broadband a reality.

Several dozen of those comments come from education stakeholders, who responded to the FCC's call for feedback on how it might leverage the e-Rate in its national plan.

The e-Rate provides telecommunications discounts of up to 90 percent for eligible schools and libraries, based on the percentage of students they serve who qualify for free or reduced-price lunches and whether they are considered in an urban or rural area.

Under current program rules, schools applying for discounts cannot use e-Rate funded equipment to deliver internet access to their communities, either by acting as an internet service provider or by opening their facilities to the public after school.

Relaxing these eligibility rules is an approach favored by several education stakeholders, including Albuquerque Public Schools, Chicago Public Schools, the Consortium for School Networking (CoSN), AT&T, and the state of Alaska, among others.

Keith Krueger, CoSN's chief executive, said his organization supports opening e-Rate supported connectivity in schools for community use during non-school hours, but this change is only a small step in terms of what the FCC must do.

"The far bigger and more significant

leap it must pursue is raising the e-Rate's \$2.25 billion annual cap, which has remained unchanged for more than 10 years," Krueger said. He cautioned that the program's current funding level soon won't be capable of supporting the growing demand for connectivity in schools and libraries.

"The program is oversubscribed by approximately \$1.75 billion each year and, without a major funding increase soon, the e-Rate may not be able to support the internal connections needs of our nation's poorest students. That is a tragedy that must

However, this raises several filtering issues that the FCC must think through, the company noted. Under current program rules, schools receiving e-Rate discounts must certify that they are using "technology protection measures" to block access to inappropriate content by minors. If adults use e-Rate funded infrastructure, will these filters still be in place, and who will be responsible for turning them on or off?

Besides raising the program's funding cap, education stakeholders suggested a variety of ways to ensure that e-Rate discounts



The FCC is seeking an extension on its National Broadband Plan until March.

be averted. We urge the commission to include substantially raising the e-Rate cap in its final plan," Krueger said.

The FCC should expand e-Rate benefits to include after-school use of equipment, wrote the Chicago Public Schools in its comments—but the agency also should remove the many barriers to applying, such as redundancies and complexities in the forms that cause many schools to lose out on needed funding.

AT&T also supports after-hours use of equipment by community members.

extend to schools that need them most.

AT&T suggested that the FCC adopt a "bifurcated" approach to the application process, dividing applications between "facilities" and "recurring charges" as a way to give priority to schools that need basic infrastructure. Alaska suggested capping the maximum discount rate at 70 percent for Priority 2 services (internal network connections), so the discounts on these services would extend to more applicants.

But Alaska also was among several commenters who noted that relying on the

e-Rate to help deliver broadband service to more Americans could be problematic for several reasons.

"One can argue that the primary goal and achievement of the e-Rate has been not to accelerate broadband deployment but rather to connect schools and ... libraries with some degree of internet connectivity," the state wrote in its comments to the FCC. The e-Rate "has not traditionally promoted fiber deployment, and it was not too many years ago that some FCC staff thought a T-1 [line] per school would be sufficient."

Alaska also observed that the e-Rate's "bottom-up" approach is awkward, because it relies on local school leaders to recognize a need and provide matching funds.

Tom Ryan, chief information officer for Albuquerque Public Schools, wrote that the FCC must implement transparent due-process procedures so e-Rate applicants can address concerns with their applications more quickly.

Albuquerque has some \$15 million in e-Rate requests still pending, dating back to the 2005 funding year, Ryan wrote. He added that this "black hole" in e-Rate processing makes the program "unreliable"—and is a barrier to using the e-Rate to improve broadband deployment.

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